Defining Strategic Opportunities for the Programs: The BDEF Report

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NASA Biodiversity and Ecological Forecasting
Team Meeting (virtual)
19-21 October 2021

Joe Parks from Wikimedia

Purpose

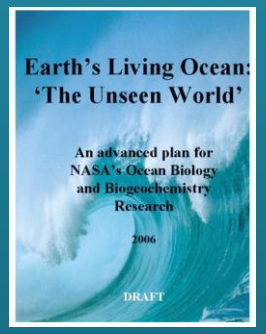
- Demonstrate role of satellite remote sensing
- Explore new ideas
- Identify program opportunities for next decade
  - “Considerations for NASA”

- Audience
  - NASA: program managers and others
  - Researchers, industry, policy makers, natural resource managers

US National Park Service

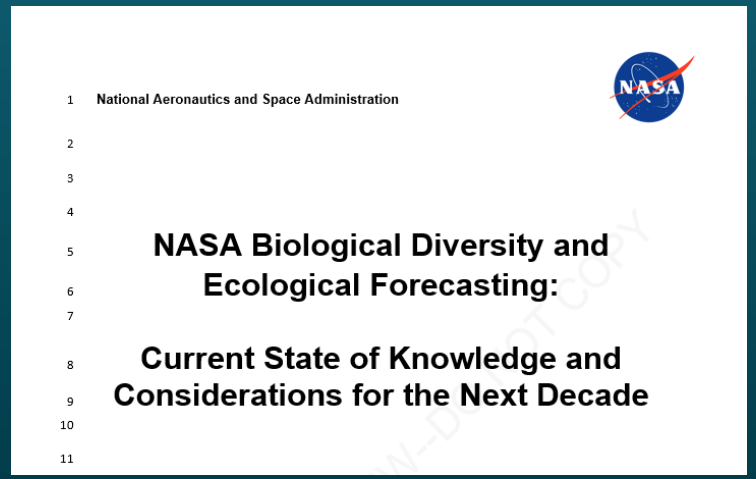
Origins

- 2007: Ocean Biology & Biogeochemistry
  - "Advanced Plan for OBB Research"
  - Update in progress



- 2015: Earth Surface and Interior
  - "Challenges and Opportunities for Research in ESI (2016)"

- 2019: Biological Diversity and Ecological Forecasting
  - In progress


National Aeronautics and Space Administration

NASA Biological Diversity and Ecological Forecasting:

Current State of Knowledge and Considerations for the Next Decade

Process

Assemble Working Group (non-NASA) ⟶

Release Questionnaire (broad community)

⬇

Consolidate responses

⬇

Identify chapters…write…

……Telecons……..

- ❑ Outside review: ended 30 September

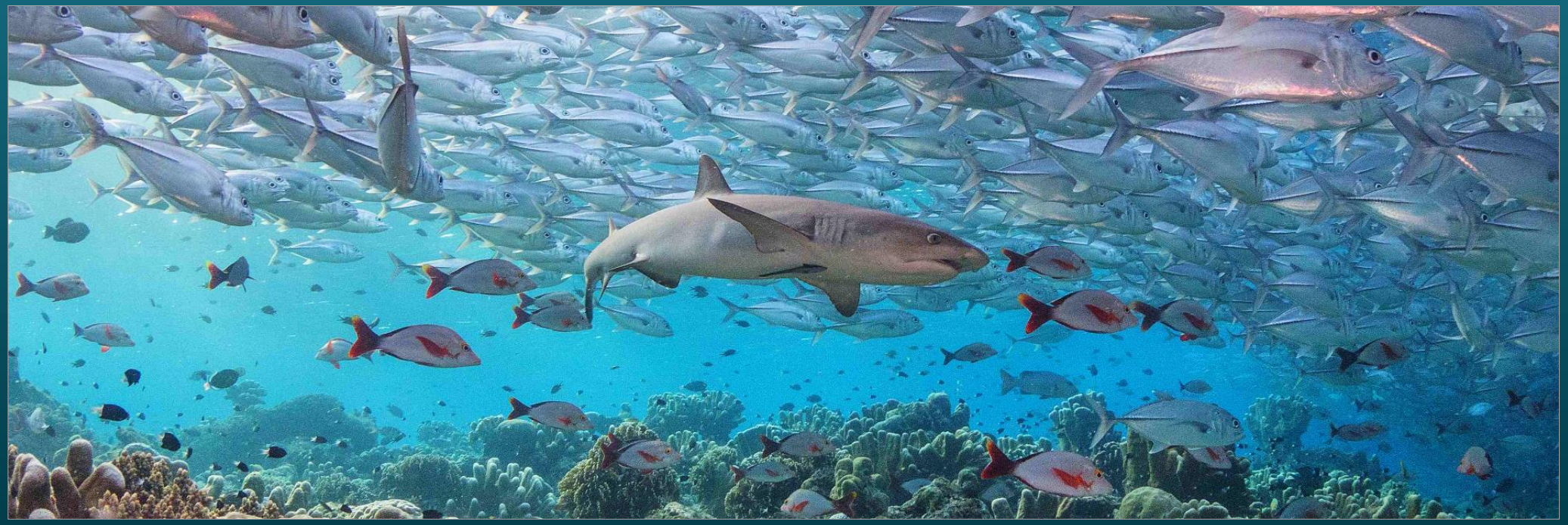
Gil Bohrer
Jeannine Cavender-Bares
Rebecca Chaplin-Kramer
Francisco P Chavez
Michael C Dietze
Temilola E Fatoyinbo
Robert P Guralnick
Erin Hestir
Frank Muller-Karger
Heather J Lynch
Matthew J Oliver
Volker C Radeloff
Heidi M Sosik
Philip A Townsend
Adam M Wilson

Report Outline

- ❑ Executive Summary
- ❑ Chapter 1: Introduction
- ❑ Chapter 2: Biodiversity: What is biodiversity and why is it Important?
- ❑ Chapter 3: Drivers of Biodiversity
- ❑ Chapter 4: People, Biodiversity, and Ecosystem Services
- ❑ Chapter 5: Scales of Biodiversity
- ❑ Chapter 6: Biodiversity and Ecosystem Resilience
- ❑ Chapter 7: Predicting and Projecting Changes in Biodiversity and Ecosystem Services
- ❑ Chapter 8: Discussion of Considerations for NASA

Chapter Outline

1. Importance
2. Current State of Knowledge
3. What Is Needed
4. Considerations for NASA



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Considerations for NASA

- 48 total, consolidated into six themes*

- Biodiversity data products
- Biodiversity observations *in situ*
- Biodiversity observations from space
- Biodiversity and ecological modeling and forecasting
- Partnership and collaboration on biodiversity activities
- Capacity for biodiversity research, applications, and monitoring

** Impossible to capture all Considerations*

Considerations for NASA

❑ Biodiversity Data Products

Provide more higher-level data products, increase their breadth, and enhance their discoverability and usability

- Landsat products
- Research to operations
- Formats
- Standards
- Multi-source integration

❑ Biodiversity Observations in situ

Improve in situ observations so they can better support understanding biodiversity from space

- Partnerships
- Guidance from models
- New observational technology
- Standardized protocols and formats

Considerations for NASA

❑ Biodiversity Observations from Space

Ensure the continued availability of biodiversity-relevant observations from space

- Long-term continuity
- New technology
- International coordination
- Open access
- Value of remote sensing to society
- Private industry partnerships

❑ Biodiversity and Ecological Modeling and Forecasting

Enhance and utilize models to forecast biodiversity change and its impacts, guide decisions and policies, and facilitate research

- Community-scale cyberinfrastructure
- Forecast output standards
- Uncertainty quantification of outputs
- Uncertainty quantification of inputs

Considerations for NASA

❑ **Partnership and Collaboration on Biodiversity Activities**

Seek out partnerships and collaborative activities to advance utilization of remote sensing for biodiversity research and societal benefit

- Multi-disciplinary project teams
- Collaborative problem solving
- International collaboration
- Integration across terrestrial, marine, and freshwater realms
- Closer ties to end-using orgs

❑ **Capacity for Biodiversity Research, Applications, & Monitoring**

Support capacity development to increase utilization of NASA observations and biodiversity products

- Training
- Early career scientists
- Early start
- Undergraduate and graduate

Review Comments

- Comment medley:

"This is going to be a powerful report!" "excellent report" "nice job!" "truly impressed" "true substance" "thoughtful insights, comprehensive coverage" "well-curated content, well-written" "great job summarizing complex issues"

- "There is little new or innovative content."
- "many parts are so unspecific that they could have been written a decade ago"
- Structural (and length)
- "Considerations": prioritize, increase actionability
- More on data access and usability
- Don't neglect "applications to research"
- Good feedstock for next Decadal Survey

Thank you

DRAFT

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BIOLOGICAL DIVERSITY
& ECOLOGICAL FORECASTING

cce.nasa.gov/biodiversity

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